

Name: _____

Exam Style Questions
Product of Primes
LCM and HCF



Equipment needed: Pen and Calculator

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

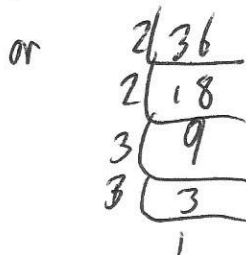
Videos 223, 224



Answers and Video Solutions



1. Express 36 as a product of its prime factors.



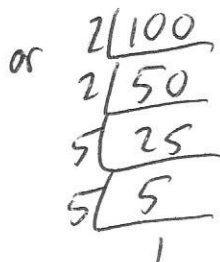
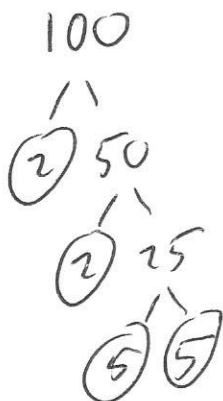
$$2 \times 2 \times 3 \times 3$$

or

$$2^2 \times 3^2$$

(2)

2. Express 100 as a product of its prime factors.



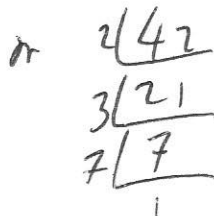
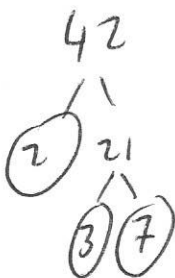
$$2 \times 2 \times 5 \times 5$$

or

$$2^2 \times 5^2$$

(2)

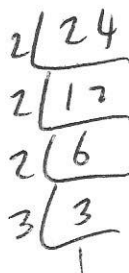
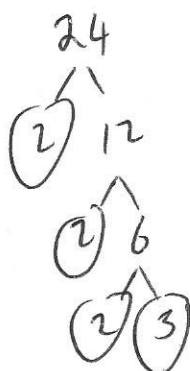
3. Write 42 as a product of its prime factors.



$$2 \times 3 \times 7$$

(2)

4. Write 24 as the product of its prime factors.
Give your answer in index form.

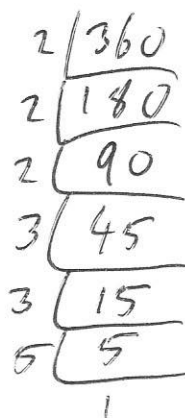
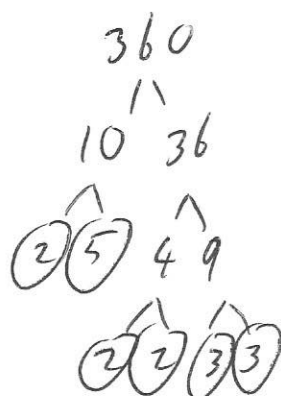


$$2 \times 2 \times 2 \times 3$$

$$2^3 \times 3$$

(3)

5. Write 360 as a product of its prime factors.



$$2 \times 2 \times 2 \times 3 \times 3 \times 5$$

$$2^3 \times 3^2 \times 5$$

(2)

6. Write 5760 as a product of prime factors.



Give your answer in index form.

$$2^7 \times 3^2 \times 5$$

(2)

7. A number is written as a product of its prime factors as $2 \times 3^2 \times 5$



Work out the number.

$$2 \times 3^2 \times 5$$

$$2 \times 9 \times 5 = 90$$

90

(2)

8. Given that $18000 = 2^a \times 3^b \times 5^c$



Find the values of a, b and c.

$$2^4 \times 3^2 \times 5^3$$

$$a = 4$$

$$b = 2$$

$$c = 3$$

(2)

9. $3x^2 = 75$



(a) Find the value of x.

$$x^2 = 25$$

$$x = 5$$

or

$$\begin{array}{r} 75 \\ 3 \overline{) 75} \\ \underline{21} \\ 25 \\ 5 \overline{) 25} \\ \underline{25} \\ 0 \end{array}$$

or

$$\begin{array}{r} 75 \\ 5 \overline{) 75} \\ \underline{25} \\ 50 \\ 5 \overline{) 50} \\ \underline{50} \\ 0 \end{array}$$

5

(2)

(b) Express 75 as a product of its prime factors.

$$75 = 3 \times 5 \times 5$$

$$3 \times 5 \times 5$$

or

$$3 \times 5^2$$

(2)

10. You are given that $3x^3 = 375$
Find the value of x .



$$3x^3 = 375$$

$$x^3 = 125$$

$$x = 5$$

or

$$\begin{array}{r} 375 \\ \textcircled{3} \overline{) 125} \\ \textcircled{5} \overline{) 25} \\ \textcircled{5} \overline{) 5} \end{array}$$

or

$$\begin{array}{r} 3 \overline{) 375} \\ 5 \overline{) 125} \\ 5 \overline{) 25} \\ 5 \overline{) 5} \\ 1 \end{array}$$

$$x = 5$$

(2)

11. You are given that $m = 2^3 \times 5$



- (a) Work out $10m$

$$\begin{aligned} m &= 8 \times 5 \\ &= 40 \end{aligned}$$

$$10m = 400$$

$$400$$

(2)

- (b) Write $10m$ as a product of primes

$$m = 2^3 \times 5$$

$$10m = 2^3 \times 5 \times 2 \times 5$$

$$10m = 2^4 \times 5^2$$

$$2^4 \times 5^2$$

(2)

12. $y = 3^2 \times 5^4$



Write $50y$ as a product of prime factors in index form.

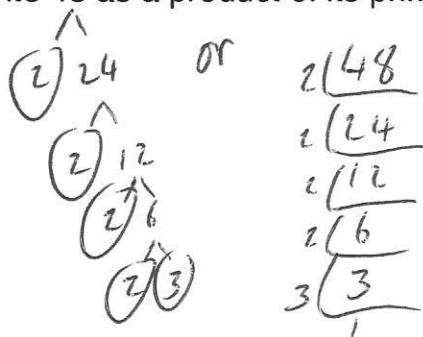


$$\begin{aligned}
 y &= 3^2 \times 5^4 \\
 50y &= 3^2 \times 5^4 \times 2 \times 5^2 \\
 &= 2 \times 5^6 \times 3^2 \\
 &= 2 \times 3^2 \times 5^6
 \end{aligned}$$

$$2 \times 3^2 \times 5^6$$

(2)

13. (a) Write 48 as a product of its prime factors.



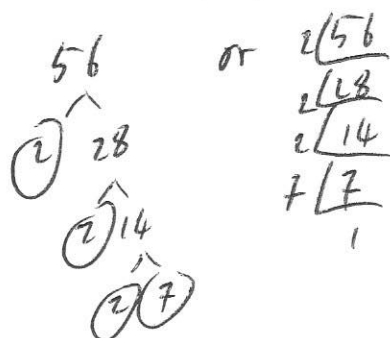
$$2 \times 2 \times 2 \times 2 \times 3$$

or

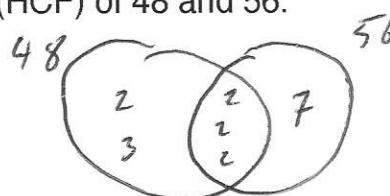
$$2^4 \times 3$$

(2)

(b) Find the Highest Common Factor (HCF) of 48 and 56.



$$2 \times 2 \times 2 \times 7$$

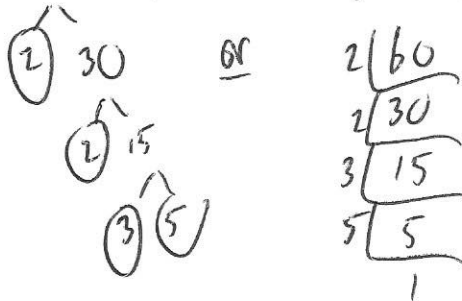


$$\text{HCF} = 2 \times 2 \times 2 = 8$$

$$8$$

(2)

14. (a) Write 60 as a product of its prime factors.

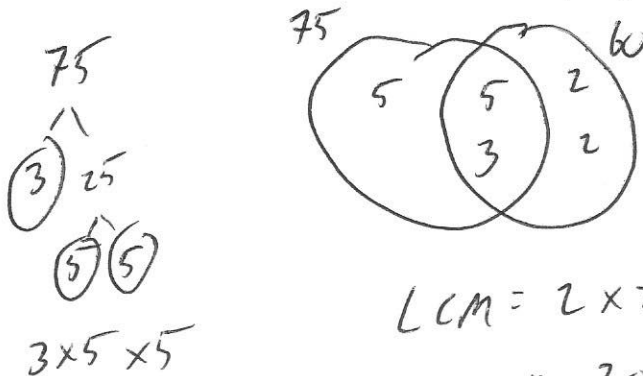


$$2 \times 2 \times 3 \times 5$$

$$\text{or } 2^2 \times 3 \times 5$$

(2)

- (b) Find the Lowest Common Multiple (LCM) of 60 and 75.



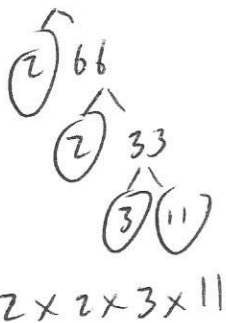
$$\text{LCM} = 2 \times 2 \times 3 \times 5 \times 5$$

$$= 300$$

300

(2)

15. (a) Write 132 as a product of its prime factors.



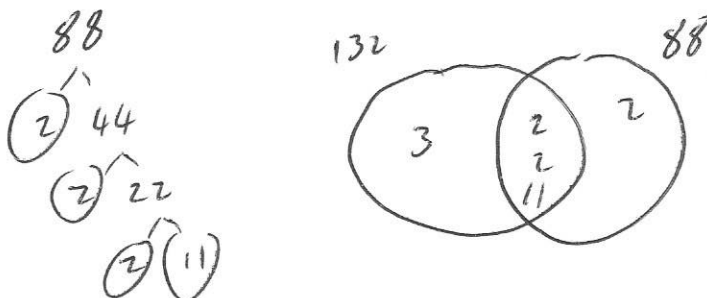
$$2 \times 2 \times 3 \times 11$$

$$2 \times 2 \times 3 \times 11$$

$$2^2 \times 3 \times 11$$

(2)

- (b) Find the Highest Common Factor (HCF) of 88 and 132.



$$2 \times 2 \times 2 \times 11$$

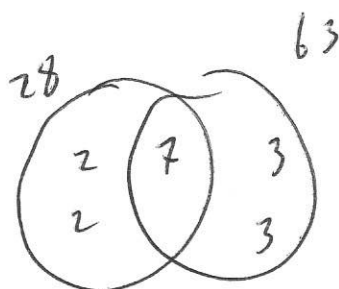
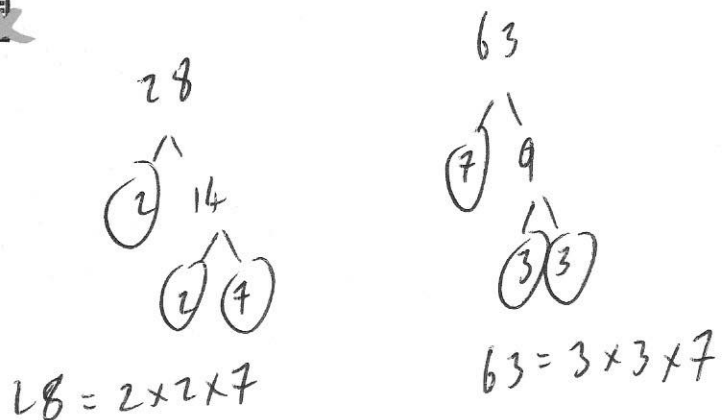
$$\text{HCF} : 2 \times 2 \times 11$$

$$= 44$$

44

(2)

16. Find the lowest common multiple (LCM) of 28 and 63.



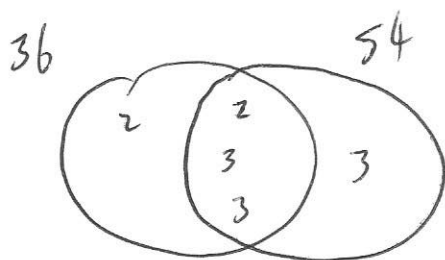
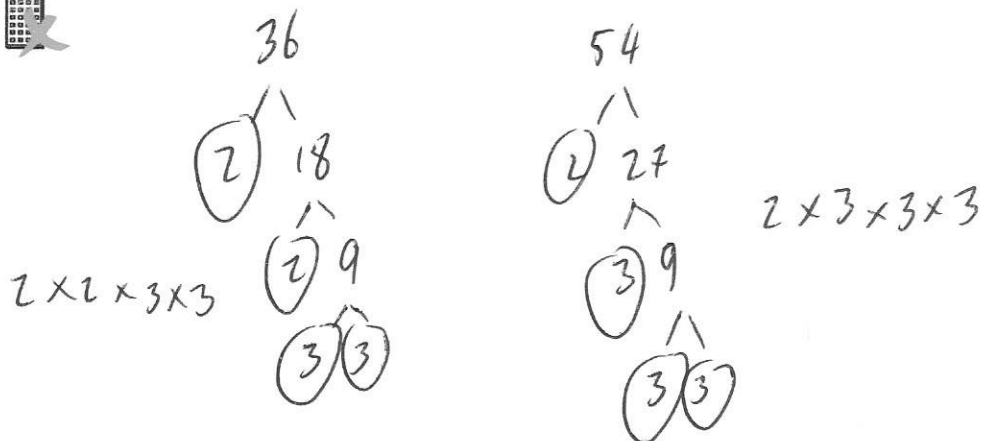
$$\text{LCM} = 2 \times 2 \times 7 \times 3 \times 3$$

$$= 252$$

252

(2)

17. Find the lowest common multiple (LCM) of 36 and 54.



$$\text{LCM} = 2 \times 2 \times 3 \times 3 \times 3$$

$$= 108$$

108

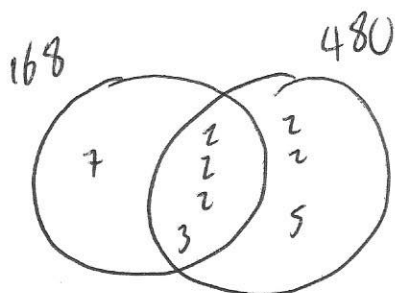
(2)

18. $480 = 2^5 \times 3 \times 5$



Find the highest common factor (HCF) of 480 and 168

$$168 = 2^3 \times 3 \times 7$$



$$2 \times 2 \times 2 \times 3 = 24$$

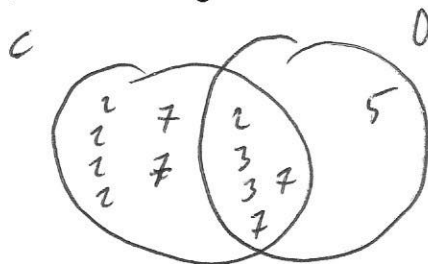
24

(3)

19. $C = 2^5 \times 3^2 \times 7^4$ $D = 2 \times 3^2 \times 5 \times 7^2$



(a) Find the highest common factor (HCF) of C and D.



$$HCF = 882$$

882

(2)

(b) Find the lowest common multiple (LCM) of C and D.

$$LCM = 3457440$$

3457440

(2)

20. You are given that $45 = 3^2 \times 5$



(a) Write each of the following as the product of prime factors in index form.

(i) 90

$$45 \times 2$$

$$(3^2 \times 5) \times 2$$

$$\frac{2 \times 3^2 \times 5}{(1)}$$

(ii) 135

$$45 \times 3$$

$$(3^2 \times 5) \times 3$$

$$\frac{3^3 \times 5}{(1)}$$

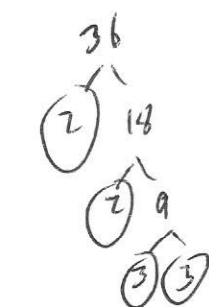
(iii) 450

$$45 \times 10$$

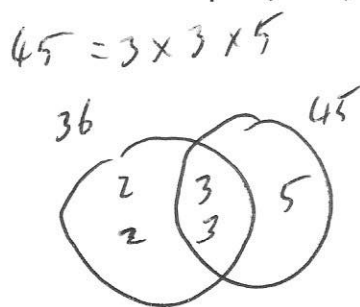
$$(3^2 \times 5) \times (2 \times 5)$$

$$\frac{2 \times 3^2 \times 5^2}{(1)}$$

(b) What is the lowest common multiple (LCM) of 36 and 45.



$$2 \times 2 \times 3 \times 3$$



$$45 = 3 \times 3 \times 5$$

$$LCM = 2 \times 2 \times 3 \times 3 \times 5$$

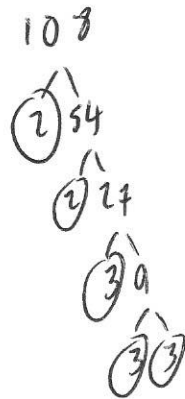
$$\frac{180}{(2)}$$

(c) What is the highest common factor (HCF) of 36 and 45.

$$3 \times 3$$

$$\frac{9}{(2)}$$

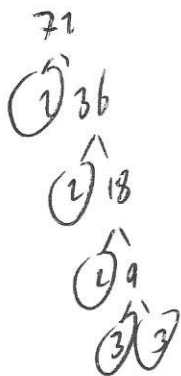
21. (a) Express 108 as a product of its prime factors.
Give your answer in index form.



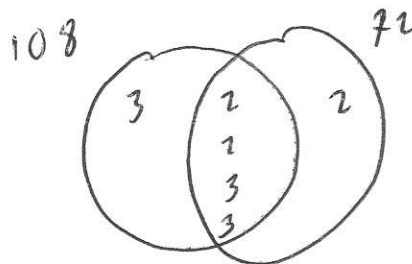
$$2^2 \times 3^3$$

(3)

- (b) Find the Highest Common Factor (HCF) of 108 and 72.



$$2 \times 2 \times 2 \times 3 \times 3$$

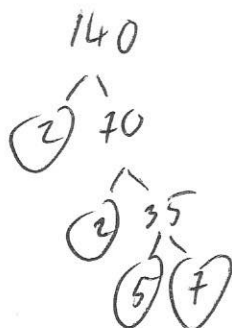


$$\begin{aligned} \text{HCF} &= 2 \times 2 \times 3 \times 3 \\ &= 36 \end{aligned}$$

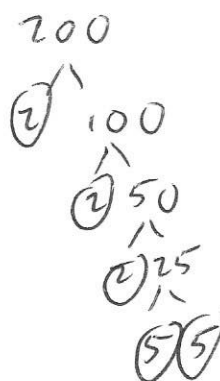
$$36$$

(2)

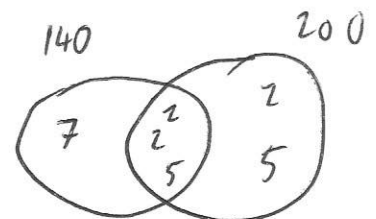
22. Find the Lowest Common Multiple (LCM) of 140 and 200



$$2 \times 2 \times 5 \times 7$$



$$2 \times 2 \times 2 \times 5 \times 5$$

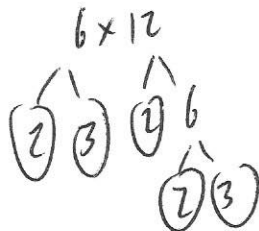


$$\text{LCM} = 1400$$

$$1400$$

(3)

23. (a) Work out 6×12 as the product of prime factors.
Give your answer in index form.



$$2^3 \times 3^2$$

(3)

- (b) Find the Highest Common Factor (HCF) of y and $5y$.

$$y$$

(1)

24. (a) Write 1008 as a product of prime factors.
Express your answer in index form.



$$2^4 \times 3^2 \times 7$$

(2)

- (b) Hence find the **lowest** whole number by which 1008 would need to be multiplied by to give a square number.

$$2^4 \times 3^2 \times 7$$

$$\downarrow \times 7$$

$$2^4 \times 3^2 \times 7^2 = 7056$$

$$\sqrt{7056} = 84$$

$$7$$

(1)

25. Find the lowest common multiple of 19 and 34.



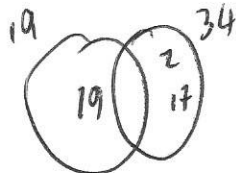
19 (prime)

34

$\textcircled{2} \textcircled{17}$

19

2×17



$2 \times 19 \times 17$

38×17

$$\begin{array}{r} 38 \\ \times 17 \\ \hline 266 \\ + 380 \\ \hline 646 \end{array}$$

646

(2)

26. $16200 = 2^3 \times 3^4 \times 5^2$



Write down the lowest whole number by which 16200 needs to be multiplied by to make a **cube** number.

$$2^3 \times 3^4 \times 5^2$$

$$\begin{array}{c} \times 3^2 \downarrow \quad \downarrow \times 5 \\ 2^3 \times 3^6 \times 5^3 \end{array}$$

$$3^2 \times 5 = 45$$

45

(2)

27. $4116 = 2^2 \times 3 \times 7^3$



Write down the lowest integer by which 4116 needs to be multiplied by to make a **square** number.

$$2^2 \times 3 \times 7^3$$

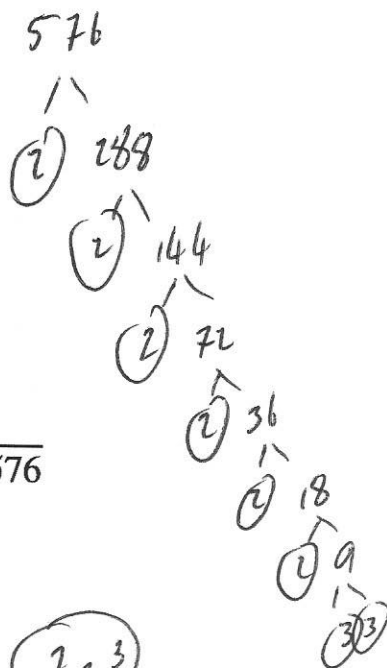
$$\begin{array}{c} \times 3 \downarrow \quad \downarrow \times 7 \\ 2^2 \times 3^2 \times 7^4 \end{array}$$

$$3 \times 7 = 21$$

21

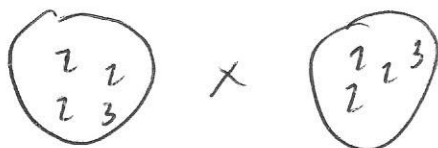
(2)

28. (a) Write 576 as a product of primes.



$$\frac{2^6 \times 3^2}{(2)}$$

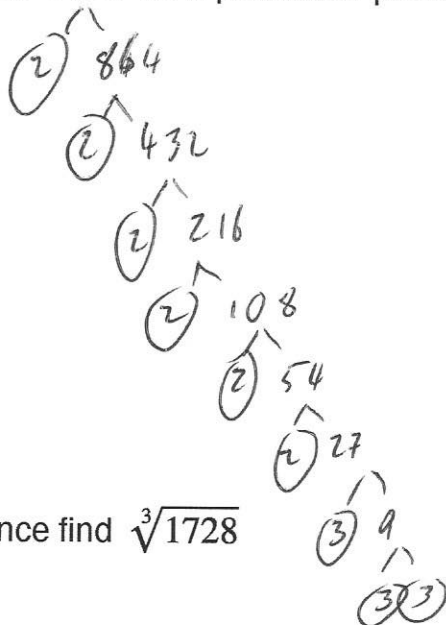
- (b) Hence find $\sqrt{576}$



$$2 \times 2 \times 2 \times 3 = 24$$

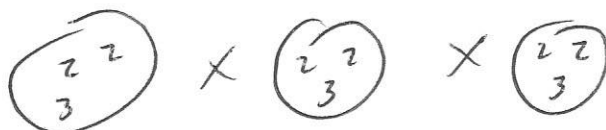
$$\frac{24}{(2)}$$

29. (a) Write 1728 as a product of primes.



$$\frac{2^6 \times 3^3}{(2)}$$

- (b) Hence find $\sqrt[3]{1728}$



$$2 \times 2 \times 3 = 12$$

$$\frac{12}{(2)}$$

30. $A = 3^3 \times c$

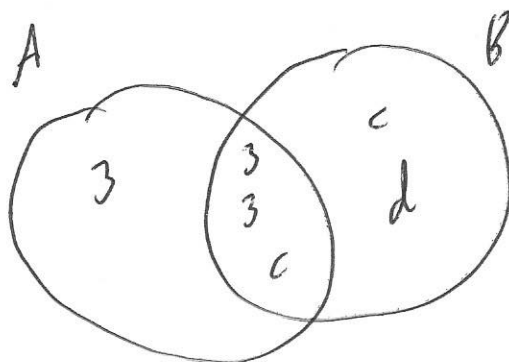


$B = 3^2 \times c^2 \times d$

The highest common factor (HCF) of A and B is 99

The lowest common multiple (LCM) of A and B is 16335

Find B.



$$3 \times 3 \times c = 99$$

$$9c = 99$$

$$c = 11$$

$$3 \times 3 \times 3 \times 11 \times 11 \times d = 16335$$

$$d = 5$$

$$B = 3 \times 3 \times 11 \times 11 \times 5$$

$$= 5445$$

$$\underline{5445}$$

(4)